

What is Claimed is:

1. A seek method of an optical disk including a first area, a second area with time information undistinguishable from time information of said first area and a third area with unique time information, comprising the steps of:

handling said third area as a plurality of sub-areas;

managing each of said first area, said sub-areas and said second area as a zone identified by using one of different zone numbers recorded in an associative-relation table memory;

storing a zone number assigned to a zone of the present position of an optical pickup or a zone number assigned to a zone of a target position serving as a seek destination of said optical pickup in a zone-number-storing memory; and

changing, before a seek operation is carried out to move said optical pickup, the zone number stored in said zone-number-storing memory as a zone number assigned to a zone of the present position of said optical pickup to the zone number assigned to a zone of a target position serving as a seek destination of said optical pickup, implementing said seek operation to move said optical pickup to the zone

identified by said zone number newly stored in said zone-number-storing memory, and ending said seek operation when said optical pickup arrives at said target position serving as said seek destination in the zone identified by said newly stored zone number.

2. A seek method of an optical disk in accordance with claim 1 wherein, before a seek operation is carried out to move said optical pickup from a present position in said first area to a target position serving as a seek destination in said second area, the zone number stored in said zone-number-storing memory as a zone number assigned to said first area of said present position of said optical pickup is first changed to the zone number assigned to said second area of said target position serving as said seek destination of said optical pickup and, then, said seek operation is actually implemented to move said optical pickup to said second area identified by said zone number newly stored in said zone-number-storing memory and, as said optical pickup arrives at said target position serving as said seek destination in said second area identified by said newly stored zone number, said seek operation is finished.

3. A seek method of an optical disk in accordance with claim 1 wherein, before a seek operation is carried out to move said optical pickup from a present position in

said second area to a target position serving as a seek destination in said first area, the zone number stored in said zone-number-storing memory as a zone number assigned to said second area of said present position of said optical pickup is first changed to the zone number assigned to said first area of said target position serving as said seek destination of said optical pickup and, then, said seek operation is actually implemented to move said optical pickup to said first area identified by said zone number newly stored in said zone-number-storing memory and, as said optical pickup arrives at said target position serving as said seek destination in said first area identified by said newly stored zone number, said seek operation is finished.

4. A seek method provided for an optical disk in accordance with claim 1 wherein:

a zone number 0 is assigned to said first area;

zone numbers 1 to M are assigned to said M sub-areas respectively where M is the number of said sub-areas composing said third area; and

a zone number N is assigned to said second area.

5. A seek method of an optical disk in accordance with claim 4 wherein, before a seek operation is carried out to move said optical pickup from a present position in said first area to a target position serving as a seek

destination in said second area, said zone number 0 stored in said zone-number-storing memory as a zone number assigned to said first area of said present position of said optical pickup is first changed to said zone number N assigned to said second area of said target position serving as said seek destination of said optical pickup and, then, said seek operation is actually implemented to move said optical pickup to said second area identified by said zone number N newly stored in said zone-number-storing memory and, as said optical pickup arrives at said target position serving as said seek destination in said second area identified by said newly stored zone number N, said seek operation is finished.

6. A seek method provided for an optical disk in accordance with claim 4 wherein, before a seek operation is carried out to move said optical pickup from a present position in said second area to a target position serving as a seek destination in said first area, said zone number N stored in said zone-number-storing memory as a zone number assigned to said second area of said present position of said optical pickup is first changed to said zone number 0 assigned to said first area of said target position serving as said seek destination of said optical pickup and, then, said seek operation is actually implemented to move said optical pickup to said first area

identified by said zone number 0 newly stored in said zone-number-storing memory and, as said optical pickup arrives at said target position serving as said seek destination in said first area identified by said newly stored zone number 0, said seek operation is finished.

7. An optical storage device carrying out a seek operation to move an optical pickup to a desired position on an optical disk having a first area, a second area with time information undistinguishable from time information of said first area and a third area with unique time information, said optical storage device comprising:

an associative-relation table memory for recording different zone numbers assigned to zones representing said first and second areas and a plurality of sub-areas obtained as a result of dividing said third area;

a zone-number-storing memory for storing a zone number assigned to a zone of the present position of said optical pickup or a zone number assigned to a zone of a target position serving as a seek destination of said optical pickup for the purpose of managing the position of said optical pickup; and

a controller configured to execute control wherein, before a seek operation is carried out to move said optical pickup, the zone number stored in said zone-number-storing memory as a zone number assigned to a zone of the present

position of said optical pickup is first changed to the zone number assigned to a zone of a target position serving as a seek destination of said optical pickup and, then, said seek operation is actually implemented to move said optical pickup to a zone identified by said zone number newly stored in said zone-number-storing memory and, as said optical pickup arrives at said target position serving as said seek destination in said zone identified by said newly stored zone number, said seek operation is finished.

8. A seek method of an optical disk having a first area, a second area with time information undistinguishable from time information of said first area and a third area with unique time information, comprising the steps of:

handling said third area into a plurality of sub-areas;

managing each of said first area, said sub-areas and said second area as a zone identified by using one of different zone numbers recorded in an associative-relation table memory;

storing a zone number assigned to a zone of the present position of an optical pickup or a zone number assigned to a zone of a target position serving as a seek destination of said optical pickup in a zone-number-storing memory; and

carrying out a seek operation to move said optical

pickup by executing the steps of:

changing the zone number stored in said zone-number-storing memory as a zone number assigned to a seek-origin zone of the present position of said optical pickup to a particular zone number assigned to a zone adjacent to said seek-origin zone;

moving said optical pickup to said adjacent zone identified by said particular zone number newly stored in said zone-number-storing memory at a first seek stage;

confirming the fact that said optical pickup has been moved out from said seek-origin zone identified by said zone number stored in said zone-number-storing memory before being changed to said particular zone number;

changing the zone number stored in said zone-number-storing memory as said particular zone number assigned to said adjacent zone of a new present position of said optical pickup to a specific zone number assigned to a zone of a target position serving as a seek destination of said optical pickup;

moving said optical pickup to said zone of said target position serving as said seek destination at a second seek stage; and

finishing said seek operation as said optical pickup arrives at said target position serving as said seek destination in said zone identified by said specific zone

number newly stored in said zone-number-storing memory.

9. A seek method of an optical disk in accordance with claim 8 wherein a seek operation is carried out to move said optical pickup from the present position in said first area to the target position serving as a seek destination in said second area by executing the steps of:

changing the zone number stored in said zone-number-storing memory as a zone number assigned to said first area of said present position of said optical pickup to a particular zone number assigned to a sub-area adjacent to said first area;

moving said optical pickup to said adjacent sub-area identified by said particular zone number newly stored in said zone-number-storing memory at a first seek stage;

confirming the fact that said optical pickup has been moved out from said first area identified by said zone number stored in said zone-number-storing memory before being changed to said particular zone number;

changing the zone number stored in said zone-number-storing memory as said particular zone number assigned to said adjacent sub-area of a new present position of said optical pickup to a specific zone number assigned to said second area of said target position serving as said seek destination of said optical pickup;

moving said optical pickup to said second area of



said target position serving as said seek destination at a second seek stage; and

finishing said seek operation as said optical pickup arrives at said target position serving as said seek destination in said second area identified by said specific zone number newly stored in said zone-number-storing memory.

10. An optical storage device carrying out a seek operation to move an optical pickup to a desired position on an optical disk having a first area, a second area with time information undistinguishable from time information of said first area and a third area with unique time information, said optical storage device comprising:

an associative-relation table memory for recording different zone numbers assigned to zones representing said first and second areas and a plurality of sub-areas obtained as a result of dividing said third area;

a zone-number-storing memory for storing a zone number assigned to a zone of the present position of said optical pickup or a zone number assigned to a zone of a target position serving as a seek destination of said optical pickup for the purpose of managing the position of said optical pickup; and

a controller configured to execute control wherein a seek operation to move said optical pickup is carried out by executing the steps of:

changing the a zone number stored in said zone-number-storing memory as a zone number assigned to a seek-origin zone of the present position of said optical pickup to a particular zone number assigned to a zone adjacent to said seek-origin zone;

moving said optical pickup to said adjacent zone identified by said particular zone number newly stored in said zone-number-storing memory at a first seek stage;

confirming the fact that said optical pickup has been moved out from said seek-origin zone identified by said zone number stored in said zone-number-storing memory before being changed to said particular zone number;

changing the zone number stored in said zone-number-storing memory as said particular zone number assigned to said adjacent zone of a new present position of said optical pickup to a specific zone number assigned to a zone of a target position serving as a seek destination of said optical pickup;

moving said optical pickup to said zone of said target position serving as said seek destination at a second seek stage; and

finishing said seek operation as said optical pickup arrives at said target position serving as said seek destination in said zone identified by said specific zone number newly stored in said zone-number-storing memory.

11. A seek method of an optical disk in accordance with any one of claims 1, 2, 3, 4, 5, 6, 8 and 9 wherein:

said optical disk is an optical disk having a storage size equivalent to a recording time period of at least 80 minutes;

said first area is an area including a lead-in area, a PMA and a PCA;

said third area is a data area for recording data recorded within a recording time period of 80 minutes; and

said second area is a data area for recording data recorded beyond said recording time period of 80 minutes;

said first area has time information undistinguishable from time information of said second area; and

said third area has unique time information.

12. An optical storage device comprising:

an optical pickup for radiating a light beam to an optical disk, said optical disk including:

a first area having first time information;

a second area provided on a circumference on the outer side of said first area as an area having second time information undistinguishable from said first time information; and

a third area provided between said first and second areas as an area having third time information

distinguishable from said first time information and said second time information; and

a control unit for controlling a movement of said optical pickup over said optical disk in a radial direction of said optical disk;

wherein, in order to move said optical pickup from said first area to said second area, said control unit first moves said optical pickup from said first area to said third area, then, said control unit confirms the fact that said optical pickup has been moved out from said first area to said third area and, finally, said control unit moves said optical pickup from said third area to said second area.

13. An optical storage device comprising:

an optical pickup for radiating a light beam to an optical disk, said optical disk including:

a first area having first time information;

a second area provided on a circumference on the outer side of said first area as an area having second time information undistinguishable from said first time information; and

a third area provided between said first and second areas as an area having third time information distinguishable from said first time information and said second time information; and

a control unit for controlling a movement of said optical pickup over said optical disk in a radial direction of said optical disk;

wherein, in order to move said optical pickup from said third area to said first area, said control unit first moves said optical pickup to said third area, then, said control unit confirms the fact that said optical pickup has been moved to said third area and, finally, said control unit moves said optical pickup from said third area to said first area.

14. An optical storage device according to claim 12 or 13 wherein:

said optical pickup has a configuration for reading out said first time information, said second time information and said third time information; and

said control unit confirms the fact that said optical pickup has been positioned in said third area on the basis of the fact that said second time information has been read out by said optical pickup.

15. An optical storage device according to claim 14 wherein said first time information, said second time information and said third time information are each ATIP time information.

16. A seek method adopted by an optical storage device, said seek method comprising the steps of:

radiating a light beam to an optical disk including:

a first area having first time information;

a second area provided on a circumference on the outer side of said first area as an area having second time information undistinguishable from said first time information; and

a third area provided between said first and second areas as an area having third time information distinguishable from said first time information and said second time information;

controlling a radiation position of said light beam on said optical disk; and

moving said optical pickup from said first area to said second area by executing the sub-steps of:

moving said optical pickup from said first area to said third area;

confirming the fact that said optical pickup has been moved out from said first area to said third area; and

moving said optical pickup from said third area to said second area.

17. A seek method adopted by an optical storage device, said seek method comprising the steps of:

radiating a light beam to an optical disk including:

a first area having first time information;

a second area provided on a circumference on

the outer side of said first area as an area having second time information undistinguishable from said first time information; and

a third area provided between said first and second areas as an area having third time information distinguishable from said first time information and said second time information;

controlling a radiation position of said light beam on said optical disk; and

moving said optical pickup from said third area to said first area by executing the sub-steps of:

moving said optical pickup to said third area;

confirming the fact that said optical pickup has been moved to said third area; and

moving said optical pickup from said third area to said first area.

18. An optical storage device according to claim 16 or 17 wherein:

said optical pickup has a configuration for reading out said first time information, said second time information and said third time information; and

said control unit confirms the fact that said optical pickup has been positioned in said third area on the basis of the fact that said second time information has been read out by said optical pickup.

19. An optical storage device according to claim 18 wherein said first time information, said second time information and said third time information are each ATIP time information.

20. An optical storage device in accordance with any one of claims 7 or 10 wherein:

said optical disk is an optical disk having a storage size equivalent to a recording time period of at least 80 minutes;

said first area is an area including a lead-in area, a PMA and a PCA;

said third area is a data area for recording data recorded within a recording time period of 80 minutes; and

said second area is a data area for recording data recorded beyond said recording time period of 80 minutes;

said first area has time information undistinguishable from time information of said second area; and

said third area has unique time information.